

# MMIC for High-Efficiency Ka-Band GaN Power Amplifiers (2007043), Phase I

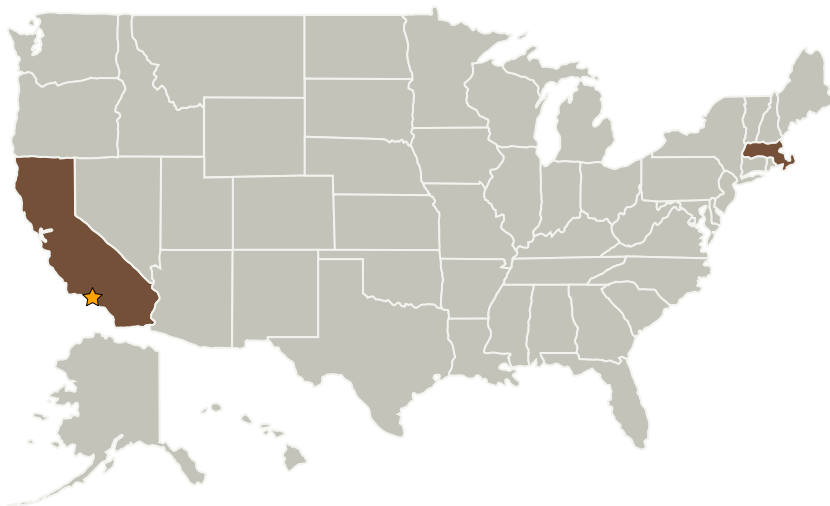
Completed Technology Project (2008 - 2008)



## Project Introduction

This proposal addresses the need for high-efficiency, high-output power amplifiers operating in the Ka-band frequencies. For space communications, the power amplifier in the transmitter consumes the most prime power and impacts the size of the payload package as well as the size of the power source. The proposed program is aimed at increasing the available output power up to 5 watts with a power-added efficiency of the final stage greater than 50%. The primary device technology selected for these amplifier designs is the Gallium-Nitride (GaN) PHEMT (Pseudomorphic High Electron Mobility Transistor) technology. This technology offers high power density, potential high frequency of operation, and excellent thermal characteristic. The primary objective of this Phase 1 SBIR is to establish the feasibility and preliminary simulation of two Ka-band high-efficiency, high-power amplifiers (HPAs) operating in the frequency range of 26 -- 32 GHz and 32 -- 38 GHz respectively. Optimum topology and class of operation of the amplifiers will be investigated. Hittite's efforts also include assessment of the technology and the status of development of GaN processes offered by a number of GaN foundries. The HPA MMICs will be fabricated and fully characterized as part of the Phase 2 effort of this program.

## Primary U.S. Work Locations and Key Partners



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## Organizational Responsibility

### Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

### Lead Center / Facility:

Jet Propulsion Laboratory (JPL)

### Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★ Jet Propulsion Laboratory(JPL)	Lead Organization	NASA Center	Pasadena, California
Hittite Microwave Corporation	Supporting Organization	Industry	Chelmsford, Massachusetts

## Primary U.S. Work Locations

California	Massachusetts
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## Project Management

**Program Director:**

Jason L Kessler

**Program Manager:**

Carlos Torrez

**Principal Investigator:**

Belinda Piernas

## Technology Areas

**Primary:**

- TX05 Communications, Navigation, and Orbital Debris Tracking and Characterization Systems
  - └ TX05.2 Radio Frequency
    - └ TX05.2.2 Power-Efficiency